Carole Hall

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EDUCATION:

- **Stony Brook University,** Stony Brook, NY

  Applied Mathematics and Statistics: August 2020 - May 2025 (expected)

  Computational Biology, PhD.

- **University of Minnesota, Twin Cities,** Minneapolis, MN

  Mathematical Biology: Genomics, B.S. September 2016 - May 2020

SKILLS:

- Python (Scikit-Learn, Pandas, PyTorch, Keras, OpenCV), MATLAB, R, C++, LaTeX.
- Machine learning, deep learning, simulations of dynamical systems.
- Molecular modeling (DOCK, UCSF Chimera), drug design (de novo, virtual screening).
- HPC cluster use, Git.

WORK & RESEARCH EXPERIENCE:

- **National Institute for Standards and Technology,** Gaithersburg, MD

  Associate to NIST under Dr. Gunay Dogan May 2022 - Present

  - Collaborate with imagine scientists on current Ph.D. research.
  - Research methods to model complexity of shapes and shape evolution.
  - Perform literature searches on existing image processing methods.
  - Create and document software and results for eventual publication.

- **Stony Brook University,** Stony Brook, NY

  Research Assistant to Dr. Heather Lynch November 2020 - Present

  - Perform research under the NASA Biological Diversity/Ecological Forecasting Program.
  - Study penguin colonies in Antarctica to create records informing policy-making decisions.
  - Research methods to extract information from low resolution satellite imagery.
  - Model shapes of colonies and topographic complexity to assess habitat suitability.

- **Aptima,** Woburn, MA

  Data Scientist Intern June 2021 - August 2021

  - Implemented methods for studying motion data in Python.
  - Performed speech recognition, sentiment analysis in Python.
  - Researched social network analysis methods to study team cooperation.
  - Analyzed large and noisy datasets.

- **Fox Chase Cancer Center,** Philadelphia, PA

  Research Assistant to Dr. Andrew J. Andrews June 2020 - August 2020

  - Modeled and simulated enzyme-catalyzed reactions using MATLAB/Python.

- Analyzed and interpreted data using statistical and machine learning methods.

- **University of Minnesota,** Minneapolis, MN

  Teaching Assistant to Dr. Duane Nykamp September 2019 - December 2019

  - Taught students to model biological processes using dynamical systems.
  - Aided students in understanding calculus concepts applied to the life sciences.
  - Helped students with homework assignments and project creation.

- **Fox Chase Cancer Center,** Philadelphia, PA

  Undergraduate Research Fellow to Dr. Andrew J. Andrews June 2019 - August 2019

  - Simulated enzyme-catalyzed reactions in Python.
  - Researched machine learning methods such as SVM, PCA, and regression.
  - Wrote progress reports, created presentations.

- **Rose: Smarter Mental Health,** New York, NY

  Machine Learning Intern September 2018 - May 2019

  - Developed machine learning software (sentiment analysis, sorting algorithms) in MATLAB.
  - Processed large sets of language data for analysis.

- **University of Minnesota,** Minneapolis, MN

  Teaching Assistant in the Math Center for Educational Programs September 2018 - May 2020

  - Taught advanced mathematics topics to middle and high school students during the week.
  - Ran weekend activities to engage students in the area to applications of mathematics.
  - Graded homework and exams, prepared paperwork, and interacted with parents.

- **University of Minnesota,** Minneapolis, MN

  Undergraduate Researcher in Combinatorics/Number Theory January 2018 - December 2019

  - Prepared weekly presentations, attended conferences, and recorded work in publications.

HONORS & AWARDS

- Institute for Advanced Computational Science (IACS) Junior Researcher Fellowship Award (2022-2023).
- Society for Industrial and Applied Mathematics (SIAM) Travel Award (2022).
- Mathematical Association of American Outstanding Poster Award (2019).

PUBLICATIONS & APPEARANCES:

- Hall, Carole. (2022 July). “Modeling the Spatial Aggregation of Adélie Penguins”. Talk presented at the Society for Industrial and Applied Mathematics (SIAM) Mathematics of Planet Earth Conference, Pittsburgh, PA.
- Hall, Carole. (2022 March). “How the complexity of Adélie penguin colony shape relates to the chance of colony collapse”. Talk presented at the Aspen Center for Physics Conference on the Dynamics of Social Interactions, Aspen, CO.

- Adams, Ashleigh & Hall, Carole. (2019, January). “Simplicial Complexes of Zero-Sumfree Sets”. Poster session presented at the Mathematics Association of America Undergraduate Poster Session, Baltimore, MD.
- Adams, Ashleigh & Hall, Carole. (2018, October). “Simplicial Complexes of Zero-Sumfree Sets”. Talk presented at the Midwest Conference on Combinatorics and Combinatorial Computing, Duluth, MN.
- Adams, Ashleigh & Hall, Carole. (2018, August). “Simplicial Complexes of Zero-Sumfree Sets”. Poster session presented at the 2018 Summer Undergraduate Research Symposium, Minneapolis, MN.
- Adams, A., Hall, C., & Stucky, E. (2019). Classifications of ℓ-Zero-Sumfree Sets. *The PUMP Journal of Undergraduate Research*, *2*, 179-198. Retrieved from https://journals.calstate.edu/pump/article/view/1805.